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AN EXPERIMENTAL STUDY OF MIXED FEELINGS¹

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¹From the Psychological Laboratory, Cornell University.

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The term 'mixed feeling' may be used in a psychophysical or in a psychological sense. A psychophysical mixture is a mixture of conditions resulting in a single feeling, a *Totalgefühl*, just as the mixture red and green results in a single color or brightness. A psychological mixture is the strict coexistence of two feelings, just as red and green may be experienced side by side in the same visual field. Lehmann² has compared these two types to mechanical mixture and chemical union: "Die Psychologen haben bisher scharf gesondert zwischen 'Gefühlsmischungen' und 'Gemischten Gefühlen,' welche letzteren dadurch charakterisiert sein sollten, dass die einzelnen emotionellen Elemente so verschmolzen wären, dass diese sich nicht aussondern liessen, sondern ein einziges Gefühl bildeten. Das Verhältnis zwischen diesen beiden Zuständen, der Gefühlsmischung und dem gemischten Gefühl, sollte also den Gegensätzen völlig analog sein, die wir aus dem rein physischen Gebiete kennen, den mechanischen Mischungen und chemischen Verbindungen." In the present paper a 'mixed feeling' is a consciousness in which pleasantness (P) and unpleasantness (U) are strictly coexistent, a *Gefühlsmischung*.

We make no assumption regarding the number of feeling dimensions and the number of affective qualities. We start from the fact, generally admitted by psychologists, that certain experiences are reported pleasant and others unpleasant. Our problem is simply: Do pleasant and unpleasant experiences occur simultaneously? May pleasantness and unpleasantness coexist? This is a question of fact and the appeal, therefore, is to experiment.

HISTORICAL

Orth,³ in 1903, studying the *Bewusstseinslage* of doubt, published in full 28 reports (7 tests for 4 subjects). He worked with groups of lines and points and gave his subjects problems the solution of which would arouse doubt. In his reports U is recorded 10 times (in 9) and P 5 times (in 4). A single paragraph refers to mixed feelings: "Besondere Beachtung verdienen die Aussagen der Vpn. Mayer in Versuch 7. Dort finden wir die Beobachtung von 4 sich folgenden Gefühlszuständen, nämlich erst Lust, dann Unlust, weiter wieder Lust und end-

²Lehmann, A. Die Hauptgesetze des menschlichen Gefühlslebens, 1892, 241.

³Orth, J. Gefühl und Bewusstseinslage, 1903, 127.

lich nochmal Unlust. Diese Folge scheint mir auf das Nichvorkommen von gemischten Gefühlen hinzuweisen." Hayes,⁴ in 1906, at the conclusion of a study of the Wundtian tridimensional theory writes: "To us, it has seemed best, instead of extending the method of paired comparisons beyond the point now reached to other classes of stimuli, to change the venue of the problem altogether, and to attack it on the side of *mixed feelings*. A second article will therefore report an experimental study of these much-discussed processes." The second article was never published, but Professor Hayes has kindly permitted us to make use of his results. The work was done in the Cornell laboratory in 1905-06 with two subjects, but the unpublished article is based upon 134 reports of a single subject. Pairs of simultaneous stimuli were used, a stimulus to P with a stimulus to U: (1) taste solutions containing sugar and quinine in various percentages, (2) taste solutions (sugar or quinine) and sounds (chords or discords from forks), (3) sounds (chords or discords) and odors (valerianic acid, carbon bisulphate, essence of peppermint, cinnamon). The subjects were instructed "to attend to the sensations aroused . . . and then to recall the experience and report on the sensations and affections experienced." The result of the experiment was negative; "it seems that we often have side by side in consciousness, sensations (or complexes of sensations) that when alone are distinctly P or U. Here then we might expect to find P and U side by side; but the observer confidently asserted that they never did coexist." Alechsieff,⁵ in 1907, attacked the problem from the standpoint of the tridimensional theory, combining the methods of impression and expression. Like Hayes he experimented with pairs of simultaneous stimuli: tastes and smells, tones and colors. He quotes 2 complete reports (from 2 subjects) and concludes: "Aus diesen und 27 ähnlichen Versuchen kamen wir zu dem Schluss, dass Lust und Unlust nicht gleichzeitig in unserem Bewusstsein existieren können, sie können nicht nebeneinander, sondern immer nur nacheinander von uns erlebt werden."

Johnston,⁶ in 1906, at Harvard, set out to examine experimentally "whether it is really impossible that various feelings coexist and remain distinguishable." For stimuli he used simultaneous combinations of "sounds, colors, odors, simple figures, and tactual surfaces," and for the more complex feeling-states "sentences and pictures more or less morally and esthetically suggestive." Perry pictures were cut out and presented on a colored background; the colors "were allowed to play their part in the feeling aroused." The subjects (10 men and 2 women) were unable at first to obtain mixed feelings but "after considerable training, the subjects, with a single exception, *were all convinced that both feeling-tones, for tactual and visual impressions, could be present at once.*" Nakashima,⁷ in 1906-07, also at Harvard, studying the time-relations of affective processes, instructed his ten subjects (among other things) to pay special attention "to inhibition, reinforcement, and coexistence, if there were such processes." In the work with complex visual impressions a single sentence tells the story:

⁴Hayes, S. P., A Study of the Affective Qualities, *Am. Jour. of Psychol.*, 17, 1906, 393.

⁵Alechsieff, N., Die Grundformen der Gefühle, *Psychol. Stud.*, 3, 1907, 259-263.

⁶Johnston, C. H., The Combination of Feelings, *Harvard Psychol. Stud.*, 2, 1906, 159.

⁷Nakashima, T., Time-relations of the Affective Processes, *Psychol. Rev.*, 16, 1909, 313, 319.

"There are a few cases of mixed feelings mentioned in the records of H, F, D and T." In another study,⁸ Nakashima devotes a short section in the discussion of his incidental results to the subject of mixed feelings. One of 4 subjects reports a mixed feeling, but later declares: "I do not think (at any rate with an observer of my type) the method is suitable for settling the question." "The remaining observers are strongly of the opinion that mixed feelings do not occur." Koch,⁹ in 1911, states that "die Behandlung der Fragen nach der Möglichkeit einer Mischung von Lust und Unlust. . . Veranlassung zu besonderen Versuchen gab." He worked with combinations of colors, tones, and with tastes, smells, and pain. He notes 8 mixed feelings reported by 3 (including himself) of 9 subjects. "In mehreren Beobachtungen wird das gleichzeitige Vorhandensein von Lust und Unlust im Bewusstsein festgestellt." Kellogg,¹⁰ 1912-13 and 1913-14, in the Harvard laboratory, set out "to produce feelings as normal as possible under laboratory conditions, and in such a manner as to lead to interference." There were eight subjects in the first part (5 men, 3 women) and seven in the second (6 men, 1 woman), of whom one had also worked in the first. "For materials, picture postcards and pictures cut from magazines with a few from surgical books, were used." The pictures were exposed alternately at rates varying from 10 to about 115 per min. in a modified form of the Dodge tachistoscope. "The general method rests upon the known tendency of feelings to persist, and upon the qualitative opposition of feelings. These two opposed tendencies give something definite to be worked out." The published result contains 345 complete reports from which Kellogg draws the conclusion that "with some subjects, there is a tendency to parallelism," and further that "the occurrence of parallel or mixed feelings" is correlated with "(1) readiness of response—the occurrence of feeling even with rapid alternation—and (2) the scope of response—the occurrence of feeling from stimuli offered, despite the distraction of a task in mental arithmetic." Wohlgemuth,¹¹ in 1917, published a report of experimental work done at University College, London. He worked with single and paired stimuli, and his four subjects "had to introspect on something like 400 stimuli." A good many mixed feelings are found in the protocols, but Wohlgemuth does not mention this fact in his conclusion; he is especially interested in the differentiation of pain and unpleasantness.

EXPERIMENTAL

I. PLAN OF THE EXPERIMENT

The present experimental work upon mixed feeling was done in the Cornell psychological laboratory from October 1917 to February 1918.

⁸Nakashima, T., Contributions to the Study of the Affective Processes, *Am. Jour. of Psychol.*, 20, 1909, 184.

⁹Koch, B., Experimentelle Untersuchungen über die Mannigfaltigkeit der elementaren Gefühlsqualitäten, Halle Diss., 1911, 8, 89.

¹⁰Kellogg, C. E., Alternation and Interference of Feelings, *Psychol. Monog.*, 18, 1915, 14-18, 89-90.

¹¹Wohlgemuth, A., On the Feelings and their Neural Correlate, with an Examination of the Nature of Pain, *Brit. Jour. of Psychol.*, 8, 1917, 437-451.

Subjects. The following kindly acted as subjects: (B) Mr. H. G. Bishop, assistant in psychology; (Da) Dr. K. M. Dallenbach, instructor in psychology; (Di) Mr. F. L. Dimmick, assistant in psychology; (F) Miss C. L. Friedline, graduate student in psychology; (G) Miss J. M. Gleason, fellow in psychology; (H) Mr. L. B. Hoisington, instructor in education; (K) Miss M. Kincaid, graduate student working in psychology; (O) Dr. R. M. Ogden, professor of education; (W) Dr. H. P. Weld, assistant professor of psychology.

General Method. Our general method was to establish a relatively permanent affective consciousness of moderate intensity, and then by stimulation to superinduce a brief affection of opposite sign. If, for example, a stimulus to P is applied without disturbing the permanent conditions of U, one might expect to find a mixture of the feelings provided, of course, that the test be repeated a sufficient number of times.

At first we endeavored to catch P and U together by taking a snapshot of consciousness when we judged that the feelings had had time to mix. The subjects were instructed as follows:¹²

"In this experiment be passive and receptive. Let the experimental situation have its way with you. Make no resistance to the stimuli; let them have their full effect.

"When you hear the signal 'now,' report immediately the affective character of the experience which you were having at that moment. After this any further report, giving details of the experience, will be in order."

It was found, however, that the reports contained a good deal of ambiguity. Since in an experiment of this kind it is exceedingly important to have a clear statement of temporal relations, we decided to instruct the subjects to trace the course of feeling for a given interval. Accordingly the second paragraph of the instructions was changed to the following:

"There will be two signals: 'now. . . now.' After the second 'now' you will report the course of feeling during the interval between the signals."

This latter instruction was used for the greater part of the experiment.

Before every experimental hour we secured a written record of the subject's abiding mood.

Procedure. Every subject worked two hours a week, usually in the morning, and not on successive days. The work was uninterrupted except for the Christmas holidays.

The subject, with eyes closed, was comfortably seated in a Morris chair. The chair was in a curtained enclosure about 1.5 X 3 m. When visual stimuli were used, the room was darkened, and then illuminated by two 75 watt mazda daylight lamps about 1 m. above the chair.

The stimuli were arranged on tables outside the curtain enclosure. The experimenter entered the enclosure behind the subject, and the noise of his approach served as a preparatory signal. In the work with pictures (see below) the experimenter did not enter the enclosure, but through a trap in the curtain displayed the picture about 1 to 1.5 m. in front of the subject.

¹²All instructions were typewritten on cards 5 X 8 in.

Divisions of the Experiment. The experiment as a whole comprises four divisions.

In the first division we devised 'natural' situations that would evoke a relatively permanent feeling-consciousness. For example, we asked the subjects to omit breakfast; and when a hunger *U* had been obtained, we superinduced *P* by the smell and taste of food. In another situation *P* was aroused by stroking the forehead gently with velvet; *U* was superinduced by sandpapering the tip of the nose or chin, or by presenting the odor of stale cheese, H_2S , or asafoetida. In another situation we resorted to a form of torture in which water was made to drip on the subject's forehead and run down his face; when *U* was established we presented perfumes, chocolate peppermint candies, chords upon tuning forks, etc. Other situations involved *P* and *U* memories, dizziness, tickle in nose and ear with a broom straw, warmth and colds, honey, noise, and numerous other stimuli.

In the second division of the experiment we worked with single stimuli. The early reports contained a good deal of *Kundgabe*, and we thought that by simplifying the experiment a better quality of report might be obtained. The time between presentation of the stimulus and the first word of response was taken with a stop-watch. For stimuli we used 14 different odors, 10 taste complexes, 10 tactual complexes, and 10 auditory stimuli (tones and noises). These stimuli are included in the list below.

In the third division of the experiment simultaneous stimuli were used. At first a stimulus to *P* was presented, and when *E* thought that it had exerted its full effect a stimulus to *U* was added, and conversely. The following stimuli were used in combinations which for every subject proved to be the most effective.

1. Olfactory: vanilla, chocolate, orange, lemon, heliotrope, rose perfume, crab-apple blossom perfume, white rose perfume, turpentine, anise, cinnamon, oil of juniper, oil of bergamot, oil of mace, cloves, bitter almond, nitrobenzole, benzoyl chloride, nutmeg, coffee, asafoetida, stale cheese, onion, H_2S , castor oil, mutton tallow.

2. Gustatory: sugar solution, salt solution, quinine solution, vinegar, chocolate peppermint candy, sarsaparilla, alum solution, castor oil, solution of vinegar and quinine, apple, banana, honey.

3. Tactual: cotton (pressure and tickle), broom straw (tickle: nose and ear), sharp nail (forehead and cheek), velvet (stroke forehead), heated and cold brass (contact), sandpaper Nos. 1, 1.5, 2 (chin, nose, forehead, teeth, arm), clothes pin (pinched on nose), snap with rubber band on neck, rap with piano hammer on forehead, slap with lamella on face, pressure cold potato, itch from cowhage, current of air (on cheek or in ear).

4. Auditory: set of König forks c, d, e, f, g, a, b, c' (first accented

octave; single tones, chords, discords), blown bottles, mouth organ, harmonium, organ pipe, metal fife (shrill), metronome (various rhythms), tomtom, rattle (objects in wooden box), sizzle (lithia in cup of water), crumpling paper, crash (wooden box dropped to floor), squeak (cork turned in bottle), filing saw and glass.

The work with superimposed stimuli was not clearly marked off from that with single stimuli; the two divisions were dovetailed, so that for a number of days the experimental hour was commenced with six to eight tests with single stimuli and was completed with superimposed stimuli.

In the fourth division of the experiment we worked with visual stimuli and aesthetic feelings. Following Kellogg we used pictures¹³ but our method was different. We used large colored plates of skin diseases (40 X 55 cm.), plates illustrating the Japanese ornamental arts (30 X 40 cm.), plates of oriental rugs and runners (20 X 30 cm.), and a few Whistler etchings of smaller size. Pictures to P and U were shown alternately in both time orders. At first each picture was shown for 10 sec. so that the single test lasted 20 sec. Later 2, 3, and occasionally 4 alternations were made in the interval of 20 sec. Following Johnston we used colored forms; we combined agreeable colors and disagreeable forms, and conversely. Very little work, however, was done with colored forms, since the feelings aroused were weak and the judgments for the most part were intellectual.

In this final division of the work we also combined pictures with phonograph music, tuning fork tones, noises, and tactual stimuli.

II. QUANTITATIVE RESULTS

Percentage of Mixed Feelings. Some of the reports are clear and positive statements that P and U were experienced at the same moment (Table I, col. 1). Other reports contain expressions of doubt and uncertainty regarding the simultaneity of P and U (col. 2). Still other reports were at first equivocal, and in these cases the subject was questioned¹⁴ about

¹³ The pictures used were: *Atlas of Portraits of Diseases of the Skin*, pub. Vienna and copied London for new Sydenham Soc., 1858-84; Audsley, G. A., *Oriental Arts of Japan*, 1884, I and II; Black, A. and C., *Oriental Carpets, Runners and Rugs*, London, 1910; *Moderne Decorationsmalereien*, 3 Aufl., 1890-91; Bacher, O. H., *With Whistler in Venice*, 1909.

¹⁴ Later in the experiment we gave up the questioning method for a graphic. The subject was given paper and pencil and asked to draw the course of feeling for the period covered by the report. This suggestion came from subject K, who visualized the course of feeling. The graphic method eliminates the possibility of suggestion which is

the temporal relations. Occasionally the report was positive after the questioning (col. 3).

TABLE I
PERCENTAGE OF MIXED FEELINGS

Subj.	Positive reports	Doubtful reports	Positive by questioning	Total 1, 2, 3	Total ¹⁵ No. reports	Percentage mixed feelings
B	0	0	0	0	193	0
Da	0	1	0	1	275	0.36
Di	0	2	0	2	242	0.82
F	4	2	1	7	252	2.77
G	0	5	0	5	232	2.15
H	4	7	0	11	242	4.54
K	21	6	10	37	307	12.05
O	2	3	1	6	278	2.15
W	0	2	0	2	191	1.04
Totals	31	28	12	71	2,212	3.21

An inspection of table I shows that out of a grand total of 2,212 reports there are 71, or 3.21%, mixed feelings. Of these 71 reports 37, or 52%, are reported by a single subject (K). If we eliminate doubtful reports, there are left 43, or almost 2%, mixed feelings. Of this number 31, or 72%, are reported by subject K. If we limit our consideration to positive mixed feeling reports, we find 31, or 1.4%, of which 21, or 67.7%, are reported by subject K. Five subjects (B, Da, Di, G, W) report no positive mixed feelings. Coexisting P and U is at best a rare experience.

Not only is mixed feeling a rare experience but it is also a doubtful one. Of the 71 mixed feelings 28, or 39.4%, contain expressions of doubt and uncertainty. How far from the truth, then, is the statement of Ladd¹⁶ that "almost all mental states which are marked by strong feeling in the case of developed minds are mixed feelings!"

Distribution of Mixed Feelings. The distribution of mixed feelings according to divisions of the experiment is shown in

inherent in the questioning method; and this is especially important since (in our experience) subjects who report mixed feelings are likely to be suggestible.

¹⁵In addition to these reports there are 130 taken with 4 subjects as follows: F 35, G 46, H 28, W 21. These reports were taken (after the main experiment) with special instructions (1) to attend to the first stimulus, abstracting from the second, and (2) to attend to both stimuli simultaneously. No mixed feelings were reported in this work.

¹⁶Ladd, G. T., *Psychology Descriptive and Explanatory*, 1894, 537.

TABLE II
TOTAL NUMBER OF MIXED FEELINGS ACCORDING TO DIVISIONS OF THE
EXPERIMENT

Subject	Situations	Single R	Super- imposed R	Visual R	Totals
B	0	0	0	0	0
Da	0	0	1	0	1
Di	0	0	2	0	2
F	3	0	4	0	7
G	2	0	1	2	5
H	10	0	1	0	11
K	1	0	24	12	37
O	0	0	2	4	6
W	2	0	0	0	2
Totals	18	0	35	18	71

TABLE III
TOTAL NUMBER OF REPORTS ACCORDING TO DIVISIONS OF THE
EXPERIMENT¹⁷

Subject	Situations	Single R	Super- imposed R	Visual R	Totals
B	97	43	35	18	193
Da	72	72	97	34	275
Di	52	78	58	54	242
F	76	63	69	44	252
G	62	62	65	43	232
H	75	66	70	31	242
K	84	75	97	51	307
O	63	63	82	70	278
W	60	64	25	42	191
Totals	641	586	598	387	2,212

tables II and III. It is clear that experimentation by the method of superimposed stimuli is productive of the most mixed feelings; it yields 5.8%. The work with visual stimuli comes second, with 4.6% mixed feelings. The work with situations comes third, with 2.8%. The work with single stimuli yields no mixed feelings, although the number of reports in this division is nearly equal to that in the work with superimposed stimuli. Surely, out of 586 tests with single stimuli, we might expect to find a few cases in which a P or U *mood* exists

¹⁷The columns correspond to the order of the experiment with the following exceptions: 54 reports of K and 23 reports of O in the division with superimposed R were given after the work with visual R.

TABLE IV
TOTAL NUMBER OF MIXED FEELINGS ON SUCCESSIVE DAYS OF THE EXPERIMENT

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Da	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0					
Di	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0					
F	0	0	1	0	0	2	0	0	0	0	3	0	1	0	0	0	0	0	0	0				
G	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0					
H	0	3	0	2	4	1	0	0	0	0	0	0	0	1	0	0	4	7	3	2	2	3	5	2
K	0	0	0	0	1	0	0	0	3	2	1	0	1	1	0	0	0	0	0	0				
O	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4	0	0				
W	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

TABLE V
TOTAL NUMBER OF REPORTS ON SUCCESSIVE DAYS OF THE EXPERIMENT¹⁹

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
B	4	16	8	20	11	16	9	13	15	20	15	8	9	7	4	1	4	6	5	2				
Da	8	20	11	14	11	8	27	33	22	17	20	14	13	6	14	13	11	13						
Di	5	17	16	14	36	30	14	21	13	15	7	6	13	15	12	9	9	10	8					
F	21	6	11	16	10	12	28	28	20	16	14	14	8	10	3	12	11	7						
G	5	14	11	16	9	7	18	31	19	16	16	14	13	7	7	14	8	10						
H	6	18	14	16	11	10	25	26	18	18	15	17	11	6	4	15	5	7	8	10	7	12	9	8
K	4	20	18	19	8	15	29	28	18	13	13	9	8	5	9	15	10	12	10	13				
O	4	13	9	16	10	11	28	24	21	9	17	8	12	12	15	21	12	10						
W	15	8	14	8	8	7	27	29	10	6	9	8	3	5	16	9	9							

simultaneously with the opposite affective quality! Some of the stimuli evoke both P and U, but not simultaneously; no mixed feelings are reported in this division of the experiment.¹⁸

The distribution of mixed feelings according to successive days of the experiment is shown in tables IV and V. Table IV shows that mixed feelings are reported in sporadic groups throughout the course of the experiment. The largest group is that of K, extending from days 17 to 24, which contains 28 mixed feelings out of 76 reports. This group stands in marked contrast to the apparently 'normal' record of K on days 1 to 16. K reports a smaller group extending over three days, 9 to 11, which is similar to that of H on days 4 to 6. There are four cases of single reports on successive days: G, 14 and 15; K, 13 and 14; O, 9 and 10; W, 4 and 5. Apart from these groups lasting for several days, mixed feelings are reported at random.

TABLE VI

DISTRIBUTION OF MIXED FEELINGS WITHIN THE SINGLE EXPERIMENTAL HOUR

Subject	Day number	Number reports	Report-numbers in which m.f. occurred
G	5	9	5, 6
H	5	11	4, 5, 6, 7
K	9	18	14-17, 18
K	17	10	3, 4-6-8
K	18	12	1, 2, 3-6, 7, 8-12
K	21	7	2, 3
K	22	12	8-11, 12
K	23	9	3, 4-6, 7-9
O	18	10	4, 5-8, 9

¹⁸The absence of mixed feelings in Wohlgenuth's group 1, taken with single stimuli, stands in clear contrast to the mixed feelings recorded in groups 2, 3, 4 in which paired stimuli were used. In Part I of Johnston's article, in which single stimuli were used, there is no mention of mixed feeling.

¹⁹The apparent irregularities in the number of reports given on different days are due to several factors. (1) In the early work the number of reports obtainable depended upon the elaborateness of the situation. In the hunger situation, *e.g.*, only a few reports could be obtained in the hour. (2) The number of reports obtainable with single stimuli was relatively large. The experiences reported upon were simpler than those of the other divisions. (3) When phonograph music was used only six or seven reports could be obtained in an hour. (4) In the division with visual stimuli, preliminary work was necessary such as arranging colors and forms in order of preference. (5) The experiences in the final division were more complex than the others and required longer time for report.

The distribution of mixed feelings within the single experimental hour is about the same as that shown in table IV for the experiment as a whole. There is a well-defined tendency for mixed feelings to occur in groups of 2, 3, or 4 consecutive reports. These groups, together with single isolated reports, occur sporadically throughout the experimental hour. Table VI shows this group tendency.

From the foregoing tables we conclude:

1. There are marked individual differences in the tendency to report mixed feelings. One subject (K) reports more than half of the total number, while another (B) does not even report a doubtful case. Five of the nine subjects report no unequivocal mixed feelings. This result agrees with Johnston²⁰, Kellogg²¹, Koch²², and Wohlgemuth²³.

2. More than a third of the mixed feelings are doubtful.

3. Mixed feelings are reported in sporadic groups irregularly throughout the course of the experiment as a whole and throughout the course of a single experimental hour. This result agrees with Kellogg²⁴, Koch²⁵, and Wohlgemuth²⁶.

²⁰Johnston, *op. cit.*, 177: "In this investigation, after considerable training, the subjects, with a single exception, *were all convinced that both feeling-tones, for tactual and visual impressions, could be present at once.*" The exception shows that mixed feelings were not universal. Since Johnston had 12 subjects, his percentages of mixed feelings were probably larger than those of Kellogg, Wohlgemuth, and ourselves.

²¹Kellogg, *op. cit.*, 83: The tendency to report mixed feelings "is quite strong with 'A' and 'B,' somewhat less so with 'N,' still less with 'K' and 'D,' and absent with 'E' and 'G.'" Two out of seven subjects report no mixed feelings.

²²The mixed feelings noted in Koch's experiment were reported by 3 of 9 subjects.

²³All of Wohlgemuth's unequivocal mixed feelings are reported by a single subject (F). Subject J reports a few equivocal mixed feelings; subject R a few doubtful cases. Subject P reports no mixed feelings.

²⁴Kellogg, *op. cit.*, 78-9. Of six consecutive reports (N) numbers 2, 3, 4 are equivocal mixed feelings, number 5 is a U coexisting with P-U, number 6 is a U overlapping P-P. Other groups in Kellogg's reports are: 80-1 (D) in which there are 2 and possibly 3 consecutive mixed feelings out of 4 reports; and 74-5 (A) in which there are coexisting P-U, P-P, and happiness-sadness, in 4 consecutive reports. See further 65-6 (I); 48 (F); 43-4 (M). The importance of analysing the reports by groups is recognized in a foot-note, 24: "In all that follows, introspections should be read carefully, in groups . . . Much that seems wholly trivial in the rough statements of the notes, is full of meaning when read in this way."

²⁵Koch, *op. cit.*, 89. Of the 8 mixed feelings noted 2 occur in consecutive reports and 2 more have a single report intervening.

²⁶Wohlgemuth, *op. cit.*, 444-7 (F). Here is a group of 10 reports

(Johnston publishes no data, so that we are left in the dark regarding any group-tendency in his experiment.)

III. ANALYSIS OF THE REPORTS

Preliminary Analysis. Our protocols contain a good many ambiguous reports which, if taken at their face value, might possibly be interpreted as mixed feelings. Following are a few examples:

"I felt pleased by the odor and very much displeased by the bristle" (B 22). "The tickle is U but the humor of the situation is P" (B28). "That's both P and U. . . I detected in the tasting of the candy both P and U and I should say that the P predominates" (B91). "Both Ps and Us came in there" (Di 14). "Very weakly P and very weakly U" (Di 198). "This is about half and half. Only a slight step over from P to U" (F17). "The air from the fan was P but the experience on the whole was U" (F 32). "The taste quality was P but tactually it was rather U" (G 27). "I felt the presence of the water as an undertone of P; yet the U was not at all intense" (H 44). "At times there were flashes of U. The general feeling throughout was P" (K 63). "The second was mostly P with a decided flash of U that lasted for quite a while" (K 207). "The P increased and abruptly disappeared simultaneously with the rise in U" (K 262). "A background of U with an occasional P coming in" (W 54).

Most of these reports owe their ambiguity to the omission of temporal relations. With F, however, ambiguity is frequently due to a tendency to sum up the experience as a whole. When asked what was meant by "the experience as a whole was P" the reply was that she "adds up the Ps and Us from first to last of the experience" (F 29). This tendency to add up the experience affectively is not lacking in other subjects. Da shows a marked tendency to estimate and compare the intensity of affective experiences. These tendencies to estimate and compare and summate give rise to temporal ambiguity.

It is needless to remark that in an experiment concerned with the coexistence of P and U ambiguous reports must be discarded. Even the report of a "mixed feeling," which is fairly common, does not guarantee coexistence. This may be seen in the following illustrations:

"A mixed feeling towards that clothes-pin on my nose. . . I never noticed the two elements there together. I believe they alternated" (B 149). "The mood is a P and U mixture, if I take the intermingling of the two as a mixture. . . I am never able to catch P and U alongside of each other" (B 190). "The regret is what I call a

with mixed feelings: (1) P-U, (2) equivocal U-U, (3) two fused Us, (4) P-U, (5) P-P-U, (6) P-U-P, (7) equivocal P-U, (8) U-U, (9) U-U-U, (10) U-U. This certainly looks like a group tendency!

mixed feeling. I should say it was a very, very rapid fluctuation between P and U . . . You get the succession P-U-P-U (I can't say how many times) as a unitary thing" (G 198). "The odor was a mixed feeling . . . I can't say that the affects were simultaneous; they may have been oscillatory" (O 195).

Illustrations of temporal and verbal ambiguity can be found in the protocols of Kellogg,²⁷ and Wohlgemuth.²⁸

The mixed feelings indicated in column 3 of table I contain some expression of doubt regarding the simultaneity of P and U. Following are examples:

"The P *seemed* to be riding on the crest of the mood; it seemed to be carried along by it. Here you have a U mood, and if the sensations are isolated by attention they are P, but when you attend to the whole of consciousness they are different. I *think* that in spite of the P sensations (P when isolated) consciousness was U" (Da 260). "I tried my best to see what happened when the music was playing and I got the odor; I *really don't know*. I know the music was P and I know the odor was U, but I don't know whether they were there at once. The two stimuli were there at once" (Di 182). "P though I *don't know*; I might just as well have said U there . . . I *think* I should have said P-U or U-P . . . They *seemed* to be up and down in consciousness—first one and then the other" (G 51). "The noise was U. You *seemed* to have a tone of P all the time. It bobs up every time it has an opportunity, and even *seems* to be present at the instant you said 'now' when I reported U" (H 46). "If P and U can coexist, I *guess* they were there" (K 62). "The idea of blowing on my cheek was U and the cool air on the cheek was P, and *so far as I can say* they were there at the same time" (O 135). "I *can't say* for the life of me whether the U of the dripping wet was there at the same time as the vague P of the scent" (W 39).

The mixed feelings shown in column 2 of table I contain no ambiguity and doubt. They are clear and positive statements that P and U were experienced simultaneously. Following are examples:

(U memory, perfume) "Here were two things in consciousness. There was the U situation in which I was all keyed up. I felt very tense about it and was almost on the verge of tears. Then on the borderline of consciousness was an odor which I recognized as slightly P. The U of the memory was still there" (F 72).—(Odors: cinnamon, cinnamon *plus* asafoetida, asafoetida) "P. P and U at the same time. Very U." (Answer) "I got two things, and it was as if one were in each nostril. On the left I got P and on the right I got U. It was like a stereoscope with red and green; at one moment red is there and at the next moment green is there. The thing flashed back

²⁷In the group of N referred to in Note 24 the equivocal mixed feelings are temporally ambiguous. Illustrations of temporal ambiguity are so numerous and general that it seems hardly necessary to quote specific cases.

²⁸Wohlgemuth, *op. cit.*, 442-3 (F) group 2 contains several ambiguous reports. See further 447 (J) group 2; 439-440 (R) group 3. The latter contains one equivocal and 3 doubtful reports.

and forth" (F 166).²⁹—(Sandpaper forehead, perfume) "U but still the P of the odor was present. You have U from one field and P from another. They didn't seem to neutralize each other or even to alternate" (H 16).—(Torture, perfume) "The P was a weak central core in the middle of me. The P did not extend below the thorax. The U was all over the body even to the feet, only it didn't get inside of me. They seemed decidedly there at the same time. They didn't seem to mix or fuse. They seemed to be two disparate things but they were both there" (H 60).—(Buttered toast, odor stale cheese) "P from the toast. An increase in P due to amusement. Then a slight flash of U coexisting with the P" (K 254).—(Sandpaper nose, perfume) "Both P and U were certainly there together. Occasionally each one would be there alone and the other disappeared, but in the intervals between they were there together" (K 301).—(Whistler etching, odor stale cheese) "There were touches of aesthetic P and there was the U from the odor. The odor was strong and I was still looking at the picture. When the distraction ceased I had both simultaneously. The cheese was U and the picture was aesthetically pleasant. I had both simultaneously for a moment" (O 249).

In addition to the 71 mixed feelings there are 5 reports of what we choose to call "multiple feelings." There are two cases of coexisting Us; two of coexisting Ps; and one of 3 coexisting Ps. Following are the reports:

(Mouth organ, slap face) "That is apparently twofold. There is a deep-seated resentment and the U of the sting. . . The two Us seemed to be there together" (O 151).—(Music, odor stale cheese) "The odor fluctuated with the music. At one point it is disagreeable music and at another point it is music and disagreeable odor combined . . . I couldn't say whether both Us were there together or whether it was a combination" (O 174).—(Torture, peppermint) "The peppermint seemed to stand out as a P by itself; but the other P (of the rhythm) persisted right through" (G 55).—(Music, tickle) "Both experiences were P, and one was a tickling P and the other a soothing P. You seem to get the body divided. All down the central core and on my left I could feel the smooth swaying rhythm of the movement, whereas on the right of the head and shoulder there was this P tickling feeling" (H 73).—(Sight human flesh and bones, taste sarsaparilla) "It seemed as if I had three simultaneous Ps; there was interest in the visual, P in the gustatory, and in the olfactory. They all blend into each other and make a uniformly P experience. I think the P from all three was there together; but I distinguished the three alternately" (K 194).

So far as the problem of coexistence is concerned, "multiple feelings" resemble mixed feelings in every respect except that the sign of the coexisting feelings is the same. Like mixed feelings they also contain a good deal of doubt and ambiguity.

In view of the fact that our stimuli were chosen to arouse simultaneous P and U, the occurrence of 5 "multiple feelings" indicates that with properly chosen stimuli "multiple feelings" might be reported in equal (possibly greater) percentages with mixed feelings. "Multiple

²⁹This is probably an alternation of feeling. The mixed feelings in every case have been given the benefit of a doubt.

mixed feelings" are found in the protocols of Wohlgenuth,³⁰ Kellogg,³¹ and are mentioned by Johnston.³²

Types and Forms of Report. The reports may be grouped into two clearly-defined types: (1) psychological reports of experience, and (2) common-sense statements *about* the object of experience. Fortunately the bulk of our data are of the first type, while the common-sense statements are distinctly in the minority.

The psychological reports are characterized by clearness and definiteness of statement regarding the temporal relations and course of P and U during the interval reported. They contain no temporal ambiguity. They are detailed accounts of the rise and fall, the fluctuations and alternations of P and U. Examples of the psychological reports, chosen at random from our data, are given below:

(Oil mace, tomtom) "There was pretty near an equality of P and U. I got P quite strong at first and then there was a shoot of U but not extreme. Then attention fluctuated back and forth and P and U fluctuated. Now there is no difference between them. It is hop, skip, and jump—and it's all over" (Di 163).—(Picture skin disease, Japanese art) "The first was U; the next was P. A relaxed feeling—relief, no strain. There was no carrying over; the transition was quick as a wink" (F 210).—(Japanese art, noise) "P, U, P, alternating, depending on whether attention is focused on the red or the blue. Then I was conscious of the auditory stimulus but it contributed no feeling whatever" (F 233).—(Velvet, sandpaper) "First U with a varied sensory content. The P was persistent; I think it disappeared perhaps once. I don't know what to say about the rest. There seemed to be a background of U. I was uncomfortable but the sensory experiences were both P. What happened, I know, was that while I was attending to the sensory experience I got the P and as soon as it was gone I got the uncomfortableness and the U would sometimes just cut across the P" (G 171).—(Sandpaper, velvet) "First P; there is no question about it. It was followed by U. There was surprise and resentment. Then alternating P and U; then U; then P; then neutral and just at the end it was P" (H 162).—(Peppermint candy, odor stale cheese) "At first the experience was P, fairly uniform, then it became very U. The U subsided somewhat. Then just for a very short interval the P came up. Mixed with that was a U feeling of perplexity. The P preceded the perplexity; I shouldn't say they were there together. Then the U reappeared slightly more intense than before" (H 168).—(Sarsaparilla, slap) "That's a hard one; it is almost impossible. There was a P which came and went; I think it fluctuated between P and indifference. Then a

³⁰See Note 26.

³¹See Note 24, subject N.

³²Johnston, *op. cit.*, 179. "When there is a clear strife between the two, they both can exist as equal partial tones with an undertone of unpleasantness in the failure to coordinate them." We take this to be the account of a multiple feeling. Cf. Titchener, E. B., *Feeling and Attention*, 1908, 54.

sharp U which was a very sudden shift from P to U; the P was gone completely. That lasted at slightly less intensity until the second signal. The taste was baffling; it wasn't known; it was a strange something. The baffledness must have been U as I recall it now, but it wasn't there all the time and there was some curiosity mixed up with it. It's too complex!" (W 136).—(Music, picture skin disease) "U at first which increased gradually for some little time. Then gradually, not suddenly, it changed to P and then back to U, and I think that the degree of U was just as much as it was before" (W 157).—(Pictures: mural decoration, skin disease) "Mildly P which fluctuated as my eye traveled up and down. I wasn't very fond of it. Then there was an interval of practically indifference, possibly a vague P. With the second it started at U but quickly shot to U of a high degree" (W 160).

In the above examples the course of P and U is traced for intervals varying from 3 to 20 secs. The bulk of our data are of this kind. They contain no mixed feelings. They contain the statement that P and U alternated or fluctuated—sometimes slowly, sometimes rapidly, sometimes so completely 'jumbled' that a full report is impossible—but there is not a single case of coexisting P-U to be found in the reports of the psychological type.

The second type of report is characterized by common-sense statements about the object of experience, usually the stimulus-object. There are two sub-types which we shall call the objective and the subjective. In the objective type P and U are referred or attributed to the object³³, *e.g.* 'the object is P,' 'the U is from the object,' 'this is a P object,' etc. The subjective type is characterized by statement of an attitude toward the object, *e.g.* 'I like the object,' or by the effect of the object upon me, *e.g.* 'the object displeased me.'

The more important forms of the objective type are:

1. 'The object was P,' 'the object was U.'

"The tickle is U but the humor of the situation is P" (B 28). "The candy was P. The itch was U but it fell pretty much in the background when I focused on the candy" (B 83). "The mixup of the two rhythms was very U" (B 166). "The bottle was always P and the clicking was always U" (B 174). "The coolness was P; the sour was U; the bite was U" (Di 13). "The cold water was U" (O 41). "The perfume is P; the wind is P; the experience as a whole is P" (F 33). "I suppose the joke was P" (K 83). "I can't decide about the second stimulus. In a way it was P but it sent a chill down me and that was U" (K 156). "The amusement was P" (K 190). "The breeze had

³³The term 'object' is here used in a most general sense. It includes, *e.g.*, tickle, humor, candy, bottle, mixup, breeze, music, joke, idea, etc., etc. In many cases the 'object' is the stimulus-object. In some cases the 'object' is reported in a psychological form, *e.g.*, a sensation, a color, a tone, etc.

been very P; the perfume was slightly U" (G 23). "The very idea of having my neck sandpapered was U but still there was an agreeable curiosity as to how it would feel" (W 7).

In addition to the above the following are selected from the 71 reports of mixed feeling: "The mood was still apparent but the cutaneous sensations were P" (Da 260). "There is no doubt but that the music was P and no doubt but that the prick was U" (Di 184). "Putting my hand in the water was P" (G 50). "The noise was U" (H 46). "After I got the taste of the peppermint it was P but the dripping on my nose made the whole thing U" (K 62). "The second was very U" (K 166). "The intangibility of it excited my curiosity and that was P . . . When it did come that amused me and that was the P part" (K 182). "The irritation was U, so you have at the same time the U irritation and the P" (K 196). "The idea of blowing on my cheek was U and the cool air was P, and so far as I can say they were there at the same time" (O 135). "The pressure on the skin was U" (O 254).

2. 'The U is from the object,' 'the P is of the object,' 'the U is caused by the object,' 'the P is due to the object,' etc.

"The P of the peppermint was very greatly exceeded by the U of the sandpaper" (Di 20). "The U from the tickle was more pronounced than the U from spilling the stuff on my clothes" (O 23). "The odor at the end gave a momentary P" (F 13). "The feelings due to the stimuli were not P" (K 64). "P came from the auditory experience" (K 215). "A more permanent state is slightly U due to H₂S in the air" (G 13). "A mild P from the warmth of the water. Quite a strong P from the tactual pattern as I put my hand down in the water" (G 38). "The P I reported was due to the quality and volume of the odor" (G 67). "P of the food; still there was the U of the hunger but I wouldn't say at the same time" (H 1). "The U of the sandpapering was so great as to distract from the perfume" (W 9).

In addition to the above the following are selected from the 71 reports of mixed feeling: "The U of the memory was still there" (F 72). "There seemed to be both the U of the odor and the P of the rubbing" (H 10). "U but still the P of the odor was present. You have the U from one field and the P from the other" (H 16). "Slightly P from the body and more intense U from the sandpapering" (H 18). "P predominated; it was due to the amusement, the auditory experience and the rhythm" (K 196). "P caused by amusement and associations" (K 296). "P from the toast; an increase in P due to amusement" (K 254). "I got P from one and U from the other at the same time" (K 285). "First P of the odor; then U of the sound with the P odor still there" (O 140). "I can't say for the life of me whether the U of the dripping wet was there at the same time as the vague P of the scent" (W 39).

3. 'A P object,' 'a U object,' 'an object P,' 'an object U.'

"The P tones were irritating" (B 22). "The one starts up a P sensation and the other a U emotion" (Di 31). "I can't tell you whether there is any P there aside from the odor P" (Di 163). "There was a U itching on one of my legs before the odor came" (O 63). "In the original experience I didn't analyse, but as I remember it now the odor had qualities that belong to U odors and qualities that belong to P odors" (O 278). "P sensations on the right from the

warm and then P sensations on the left arm from the cold water" (Da 52). "I detected a P odor and I fully expected a P perfume, so when the U odor came it was exceedingly U" (F 7). "P, even more P than the cutaneous P" (K 179). "The P surprise seemed to fuse with the music" (H 72). "It was an ideational U" (H 226). "P expectancy before the first" (W 175).

In addition to the above the following are selected from the 71 reports of mixed feelings: "When I have a P mood the P sensations seem a part of it, but here you have a U mood and if the sensations are isolated by attention they are P" (Da 260). "At the same time in consciousness was a very P odor" (F 38). "It is difficult to say whether just the odor was there or whether a P odor was there" (O 140). "Then an aesthetic P and the U odor for the rest" (O 250). "The undercurrent of U was there at the same time as the P olfactory" (K 171). "P was largely an inclination to move toward the P sensory experience" (K 317).

4. 'P was the object,' 'U was the object.'

"The U was a sort of visceral thing" (B 175). "The P is a relaxed and at-ease feeling. The U is a muscular tightening-up and tension" (F 192). "The P is a relaxed feeling" (F 194). "It seems that the organic sensation is the P localized" (H 148).

In addition to the above the following two examples are found in the 71 mixed feeling reports: "The P was a weak central core in the middle of me. The P did not extend below the thorax . . ." (H 60). "P was largely an inclination to move towards the P sensory experience" (K 317).

5. 'The object was experienced as P.'

The following two examples are found in the 71 mixed feeling reports: "Then there was on the border line of consciousness an odor which I recognized as slightly P" (F 72). "If one is there as P and the other is there as U, then they must be there together" (K 301).

The objective type of report is characterized by reference of P and U to the object and by statement *about* the object, rather than by description and report of affective experience. The principal forms of reference and statement have been given above. Forms 1 and 3 attach the *meaning of pleasantness* (or unpleasantness) to the object. In daily life we frequently say 'the day is pleasant' or 'this is a pleasant day,' by which we signify that the *meaning of pleasantness* attaches to the day, and not that 'I feel pleased.' Form 2 refers to the object as the source from which pleasantness or unpleasantness is derived. This form resembles the stimulus-error³⁴

³⁴On the stimulus error in psychophysics see: Titchener, E. B., *Exper. Psychol.*, II, ii, 1915, lxiii (and other references in index). On a similar error in the literature of thought see: Titchener, E. B., *Exper. Psychol. of the Thought-Processes*, 1909, 145 ff; 267, note 64. "The name 'stimulus error' is natural, since the confusion lies, in terms of Fechnerian psychophysics, between 'sensation' and 'stimulus.' Intrinsically, however, 'thing-error' or 'object-error' would be a better

of psychophysics. A naïve observer, *e.g.*, will state what the experience is *of* (*i.e.*, the stimulus-object), rather than describe what it *is*. The statement that P or U comes from such-and-such an object is not a direct 'report of' but rather a 'statement about' experience, *Kundgabe* rather than *Beschreibung*. Forms 4 and 5 (rare) seem to identify P or U with the object⁸⁵. The nature of this identification will appear later.

Reference to the object is not found in the psychological reports (see above examples); these trace the qualitative and intensive course of P and U with little or no mention of object.

There is, however, one form of report that might be confused with the psychological type. There is a well-defined tendency to abbreviate 'the P object,' 'the U from the object,' etc., to 'the P' and 'the U,' and by a further process of abbreviation to 'P' and 'U' simply. Such abbreviations resemble the true psychological form of report if considered apart from the group of reports in which they are set. That they are, in truth, only abbreviations is shown by several facts. In the first place, a good many of the reports contain explicit objective reference in one part and the briefer form in another. The following illustrations are selected from the 71 mixed feeling reports:

"There is no doubt but that the music was P and no doubt but that the prick was U, but I can't tell you whether the P and U were there at the same time" (Di 184). "The U of the dripping water seemed to be confined more to the skeletal muscles . . . The U was reduced by the odor" (H 58). "The U grew less in time and degree while the P was gaining all the time in the exchanges. Perhaps there was an appreciable interval between P and U that I should say was both" (H 208). "Amusement was the P part. The actual sensory thing was U . . . P and U were there together" (K 182). "P from the toast; an increase in P due to amusement. Then a slight flash of U coexisting with the P" (K 254). "Faint P and U running along together. The P was amusement" (K 269). "U and P were there together absolutely all the way through the experience except at the very instant that the cutaneous experience that gave U began" (K 306). "U and P were simultaneous. P was largely an inclination to move towards the P sensory experience" (K 317).

In the second place, reports containing the forms 'the P,' 'the U,' 'P,' 'U' are sometimes set in a group which as a whole is characterized by objective reference. In view of the tendency for reports of a certain type to occur in groups, it is

phrase; what the naïve observer confuses with his mental process is not the physical stimulus, but the thing of common-sense."

⁸⁵Koch, *op. cit.*, 10. Subject Sp, who reports 4 of the 8 mixed feelings, states: "Die Organempfindungen scheinen mir mit dem Gefühl identisch zu sein." This may be compared with H's statement: "It seems that the organic sensation is the P localized" (H 148).

probable that the brief forms are abbreviations. In the third place, the total reports in which these forms occur are exceedingly brief. In one group of mixed feelings, of subject K, the records contain little more than the bare statement that P and U coexisted. The brevity of the reports is a further indication that the forms in question are merely abbreviations.

The subjective type of common-sense report is much less frequent than the objective. It is, however, used to some extent by all the subjects, and in the case of a single subject (B) it is found in nearly 50% of the records.

The usual form of the subjective report is:

1. 'I like the object,' 'I dislike the object,' 'I enjoyed the object,' 'I was indifferent to the object,' 'I didn't mind the object,' etc.

"U; I don't like that odor" (B 8). "Just for an instant I didn't like that scraping but then I got used to it and didn't mind it because I enjoyed the warmth on my arm too much" (B 37). "Oh, that wasn't bad. I enjoyed the odor so much that I didn't mind the scratching. I didn't like the scratching but I didn't mind it much in view of the odor" (B 48). "I didn't like the music" (B 83). "I liked the first tone, but I liked the chord more" (B 113). "I liked the warmth of the thing but it was hot and I didn't like this biting quality" (B 130). "I was pretty indifferent to both. I can't say that I enjoyed the music" (B 179). "The second was U. I didn't like the colors; I didn't like it as a pictorial thing" (Di 194). "I liked the wind" (F 28). "At first I was indifferent to the odor" (G 181). "I don't like [the] . . . organ anyhow" (K 68). "I was indifferent to the whole thing" (K 188). "Somewhat painful; I didn't like it" (O 11). "An attitude 'I rather like it'" (W 132). "I found myself with the snarly facial expression that I didn't like the stuff, but there wasn't any awareness of the snarl at the time. After the second 'now' I found myself with that expression and realized that I didn't like the stuff" (W 144). "It was an 'I don't like it' attitude" (W 151).

Much rarer than the above is the form:

2. 'The object pleases me,' 'I was displeased by the object.'

"I felt pleased by the odor and very much displeased by the bristle" (B 22). "That is both P and U. I like vinegar; it pleases me" (B 91). "It hardly had a fair chance to please me because I heard the sandpaper scraping and knew what you were going to give me. This gave a little displeasure" (B 159). "At first a gentle, persuasive P; it coaxed me to be pleased" (B 168). "I don't remember that I was pleased or displeased . . . I don't like the cold water" (Di 50). "Certain parts pleased me very much and other parts were U" (H 207). "I enjoyed it and was pleased" (H 235). "I can't say that it affects me pleasantly or unpleasantly" (O 53).

The subjective type of report differs from the objective in that the former always involves the subject. Form I specifies

an attitude of the subject towards the object. Form 2 specifies the effect of the object upon the subject. Both forms are unambiguous. The objective type of report, on the other hand, is distinctly ambiguous, since it tells us nothing directly about the experience. If a subject reports 'the object was P' we, of course, can not doubt that the *meaning of pleasantness* attaches to the object. But what guarantee have we that pleasantness was *felt*? We may consider it probable that pleasantness was felt, but we never rise from probability to the relative certainty of direct report.

Analysis of Mixed Feelings. The 71 mixed feelings, without exception, are of the objective type of report³⁶. The frequency and distribution of the various forms are shown in table VII. If the feelings reported as coexisting are stated in different forms, the report is entered under two columns.

The table shows that the commonest form of report is that resembling the stimulus-error (col. 2). Of the 31 abbreviations 22 are reported by subject K.

It is certainly significant that P and U are invariably objectively referred in the mixed-feeling reports. Although it is logically possible to report a mixed feeling in the form 'I liked it and at the same moment I disliked it' or 'the object pleased me and at the same time displeased me,' there is not a single case of such subjective report. Subject B, who uses the subjective type of report in nearly 50% of his records, does not even report a doubtful mixed feeling (table I).

It is logically possible, further, to report a mixed feeling without reference at all, in the form 'P and U coexisted,' 'P and U were experienced simultaneously,' 'P and U were there together.' Of the 71 mixed feelings 16 are in this form

³⁶Kellogg notes a tendency to describe the object instead of feeling, but he would rather accept the "more natural form" of report than "run the risk of falsifying the results." See *op. cit.*, 60, note: "The task of the present section was so difficult that the subjects, even those of long experience, tended largely towards objective description instead of strict analysis in subjective terms. *They described the pictures instead of their own feelings.* However, in view of the interesting way in which these descriptions vary with the method of exposure, it seemed best to allow the statements to be made in the more natural form, rather than to run the risk of falsifying the results, or getting none at all by strict insistence upon the technical form of report" (italics ours). In his conclusion, Kellogg states that "*our results show mixed feelings only in certain of those trials in which the awareness of two stimuli was also simultaneous*" (*op. cit.*, 91). Kellogg's mixed feelings, therefore, like our own, are probably all of the objective type of report. With Johnston also (*op. cit.*, 177) the coexisting feelings are "feeling-tones, for tactual and visual impressions." Johnston's feelings, so far as we can make out, are referred to the object.

TABLE VII

FREQUENCY AND DISTRIBUTION OF THE FORMS OF STATEMENT USED IN THE REPORT OF MIXED FEELINGS

Subject	'Object was P,' 'Object was U'	'P is from object,' 'U is of object'	'P object,' 'U object,'	'P is object'	'Object as P'	Abbreviations	
						'The P' 'The U'	'P' 'U'
B	0	0	0	0	0	0	0
Da	1	0	1	0	0	0	0
Di	2	0	0	0	0	0	0
F	1	1	2	0	1	3	2
G	1	1	0	0	0	1	2
H	2	8	0	1	0	1	0
K	7	6	3	1	1	10	12
O	1	3	3	0	0	0	0
W	0	2	0	0	0	0	0
Totals	15	21	9	2	2	15	16

Columns 1, 2, 3, 4, 5 are not exclusive. Column 6 is exclusive of columns 1 to 5. Column 7 is exclusive of columns 1 to 6.

For the number of mixed feelings reported by every subject consult Table I.

(12 reported by K), all of which can be shown positively to be abbreviations of the objective forms. There is not a single mixed feeling of the psychological type of report. In this connection it is interesting to note that the records in the work with single stimulus contain little or no objective reference. There are no mixed feelings in this division (tables II and III).

We conclude that the group of mixed feelings as a whole is characterized by reference of P and U to the object and therefore by *statement about* the object rather than by *report of* affective experience.

Not only is P (or U) referred to the object and identified with the object, but also in many cases it is localized at the place of the object. The tendency to localize³⁷ the feelings is

³⁷One of Wohlgenuth's subjects (F) reports 14 mixed feelings of which 10 contain localized P and U. Localized feelings are not lacking from the protocols of Kellogg. Here is an example (*op. cit.*, 77): "The pleasantness of Mona Lisa held over an instant, appearing localized near the center of the field; the unpleasantness from the wrench seemed to 'wiggle' in from the lower left corner, and when partly in, the pleasantness from the other 'exploded' and the unpleasantness spread over the whole picture." Koch records a great many localized feelings. Note also Störing's distinction between 'Empfindungslust' and 'Stimmungslust' (*Arch. f. d. ges. Psychol.*, 6, 1905, 316-32). On localization of feeling see: Titchener, E. B., *Feeling and Attention*, 1908, 43-6; for criticism of Störing, see 336-7.

quite marked in the records of H, K and F. Following are examples of localized mixed feelings:

(Odors: cinnamon, cinnamon *plus* asafoetida, asafoetida) "I got two things and it was as if one were in each nostril. On the left I got P and on the right I got U" (F 166).—(Torture, perfume) "I seemed to have both elements there. The perfume was very, very P and it was as though you felt it in the center of your body right up through the viscera. The U of the dripping water seemed to be confined more to the skeletal muscles (the outside muscles)" (H 58).—(Torture, perfume) "The P was a weak central core in the middle of me. The P did not extend below the thorax. The U was all over the body even to the feet, only it didn't get inside of me" (H 60).—(Imaginary stink, perfume) "I had a kinaesthetic experience as though I were being pulled apart . . . The pulling apart was U. It was well down in the abdomen whereas the P you seem to feel in the upper part of your chest. Both were there together" (H 67).—(Velvet plush on right cheek, sharp nail on left cheek) "U and P were there together; . . . The feelings were not located exactly at the point of the sensory experience. They were spatially on the left and right portions of my head" (K 306).—(Pressure: cotton, sharp nail) "This time they are localized. It seems to be a split of body as well as feeling. On one side feeling U seems to be localized and on the other side feeling P seems to be localized. The spatial separation happens only when P and U are of the same intensity" (K 309).—(Pressure: cotton, sharp nail) ". . . The feelings were localized in the cheeks. When they occur together they are practically of the same intensity" (K 312).

The coexistent 'object feelings' are sometimes the objects of attention. Note the following examples:

Subject K somewhat ambiguously reports that P and U are attended to. "It was a question of attention which was predominant. The P or U came according to *which one* I attended to" (K 166). "There was an undercurrent of irritation which was U because I wasn't able to give my full attention to it" (K 171). "They (P and U) were both there and I didn't seem to attend to *both* at the same time" (K 283). "Then P and U were certainly there together. There didn't seem to be any opposition. I could attend to *both*" (K 285). "It required attention to keep the P in, but under attention *both* were there together. The U was there whether I attended or not, but when I did attend *both* were there. Attention brought the P in" (K 298).

The statement that P or U was in the background or foreground of consciousness, in the sense of attention, is fairly common. "Then there was a P but the U still seemed to be there in the background . . . The background and the P on top are there together" (F 169). "The P was either in the background or the focus all the time" (G 198). "I seem to get just a lively, little P there in the U background" (G 122). "I know that I had the bitter as a background for the sweet but I really don't know whether or not the U of the bitter was there at the same time" (W 50).

Our analysis of the 71 mixed-feeling reports has shown that they are all of the objective type. P and U are referred to the object, or attributed to the object, or identified with the object. P and U are frequently localized at the place of the ob-

ject, and are sometimes 'attended to' as one attends to a sensory object.

IV. DISCUSSION OF THE REPORTS

The Meaning Error. In discussing the objective type of report we found it necessary to distinguish³⁸ between the *meaning of pleasantness* and *pleasantness felt*. This distinction is implied in the reports of the subjects, and in some cases the difference between *meaning* and *feeling* is explicitly remarked. It is, for example, clearly shown by the following:

"The ugly one gave me an incipient shrinking in the stomach like nausea. That meant U but it didn't seem to be U" (B 187). "I had visual imagery of pineapple which was a little towards P because the meaning was 'something to eat that is P'" (Da 60). "I imagined several situations that have been U in the past but the U of these situations was not repeated. The attempt to find a U situation failed and then I turned to some future situation that might be U" (Da 69). "You assume, I suppose, that honey is P, but I don't think it is in this situation" (Di 38). "The U dwindled off but the U stimulus was still there" (F 249). "I thought 'that's a U smell.' It was purely ideational" (G 232). "There was the consciousness that U ought to be there, but that consciousness never did grow into U" (K 238). "I recognized the odor as one that might be U but it was P" (O 177). "There was a sensation of warmth with anticipation that it might become U, and there was a pressure that I recognized as an experience that was supposed to be U, but the experience was neither agreeable nor disagreeable" (O 257).

Not only do the reports demand the distinction between *meaning of pleasantness* and *pleasantness felt*, but also they bear unmistakable evidence of a confusion between *meaning* and *feeling*. This confusion is either (1) the identification of pleasant feeling with awareness of pleasant object, or (2) the inference of pleasant feeling from the awareness of an object that *has been* pleasant or that *usually is* pleasant, *i.e.*, an object that carries the meaning of pleasantness. The following reports illustrate the confusion:

"The P sensations on the margin of consciousness colored all of consciousness even though the images at the focus were U: I mean they were the same ones that before were U, but they were not U when experienced with the P" (Da 67). "Taken separately there was a strong P and a strong U but I don't know what happened. If I wasn't critical I'd say that I had both at once, but I don't think I did . . . The U was the U of the whole situation, of thwarting something I wanted to do; it was not a U stimulus. I tend to think in terms of two stimuli and say that they were both present, but the whole situation

³⁸Kellogg does not explicitly draw this distinction. On the contrary he remarks that there is "a much closer relation of feeling and intellectual processes than has usually been taught. 'Feeling' and 'meaning' often seem well-nigh identical" (*op. cit.*, 89).

was U. I knew that the picture was P and I wanted to look at it, but the interference was U" (Di 241). "Then a U and the P still seemed to be in the background. I mean the thing that gave the feeling was there but it contributed no feeling of P" (F 202). "A certain amount of P and U both. I'll take it back; it was only P at the first 'now.' I wasn't entirely passive. I visualized the clamp and got interested in the cutaneous feel and I didn't notice any affection for a little bit" (B 155). "I wasn't getting any affective tone at all and then I thought 'is it U or P?' and I called it U" (G, 111). "I don't believe there was any feeling there in the second but there must have been I suppose" (K 184). "I believe I have before reported the kinaesthesia of amusement as a P feeling" (K 230). "I know I'm mixing up amusement and P" (K 248). "The second experience although sensorily U gave an amusement that was P. . . I shouldn't have said 'sensory U;' . . . I meant it is roughness and sensory qualities which usually cause U" (K 299). "It is because I can't help seeing both things that I get the coexisting feelings" (K 264). "I was bothered at the time as to whether I was confusing the clearness of the experience with the P of it. Was it there without the P it had originally?" (W 149).

We suggest that the confusion between *meaning* and *feeling* be called the 'meaning error.'³⁹

Conditions Favoring the Report of Mixed Feelings. The tendency towards intellectualization is favorable to the report of mixed feelings. Instead of reporting affective experience the subjects tend to *judge* and *decide* whether the object is or is not pleasant. Following are examples:

"It is funny how I make these judgments. I called it U because I was anxious to give my judgment so you would stop it" (Di 91). "These Ps are judgments made after the whole thing" (Di 124). "P, though I don't know. It was having to decide something" (G 51). "I don't know; I'm just puzzled. Are you allowed to give doubtful judgments in this experiment?" (K 18). "I can't decide about the second stimulus" (K 189). "The cold water was U. I don't know what else to say; I rationalized the thing" (O 41). "I decided that it wasn't strong enough either to please or displease sufficiently to forget the dropping" (O 48). "I couldn't make up my mind. It was an intellectual experience. The inability to find it agreeable was U" (O 80). "I can't say that there was a mixed feeling. It was judged from different points of view" (O 256).

The tendency towards intellectualization is shown further by the following reports. "There was on the border line of consciousness an

³⁹Cf. Note 34. The terms 'stimulus error' and 'object-error' are hardly applicable to the confusion between meaning of pleasantness and pleasantness felt; 'meaning error' seems to us more appropriate.

This error is involved in the following 'dilemma' (Kellogg, *op. cit.*, 22-3): "Suppose that mixed parallel feelings are reported. The suggestion of a confusion of memory . . . may be valid as against the truth of the statements with regard to the experience during the trial. But what of the experience at the time the statements were made? The statements must have some basis. Then do we not face a choice between belief in affective imagery and belief in mixed feelings?" The memory *that* an experience was pleasant is not an affective image.

odor which I *recognized* as slightly P" (F 72). "I *knew* the picture was P and I wanted to look at it, but the interference was U" (Di 241). "It was very U before it arrived, and when it arrived I *knew* I liked it, but the other was too U to let me attend to it" (K 67). "I *apprehended* something U. I'm not sure whether the apprehension was U. It certainly wasn't P and it wasn't indifferent" (K 178). "I noted a form that I didn't like and a color that I did like. The thing came as a whole and I *cognized* the U form and the agreeable color" (O 224).

Frequently the judgment, or decision, or apprehension is followed by common-sense explanations. "Extremely P due to two factors: it was P because I expected something P and it was also sensory P" (K 183). "U for two reasons: I expected one more note and didn't get it and that irritated me; the second element was the U jangle" (K 184). "I was pleased because I got it into my mouth" (Di 1). "That cutaneous impression wasn't P or U because I didn't know how to react to it. That seemed to be why it wasn't P or U" (Di 159). "You needn't think that it was P because I was laughing. The reason I laughed was a reflective flash of how silly it was" (K 64). "U because I needed my hands to keep the water from running down my neck" (K 65). "All those noises are U because they disturb a P equilibrium" (K 110.)

Such rationalizations merely attach the meaning of P (or U) to the object.

A second factor favorable to the report of mixed feelings is the presence of fatigue, illness, sleepiness, worry and other unpleasant moods. This fact is shown in tables VIII-A and VIII-B. We have classified the moods (recorded before every

THE RELATION OF MIXED FEELINGS TO MOOD

TABLE VIII-A

	P mood	Indifferent	U mood
Total days.....	50	70	50
Days on which m.f. occurred.....	3	17	14
Per cent days on which m.f. occurred.	6	24	28

TABLE VIII-B

	P mood	Indifferent	U mood
Days on which m.f. occurred.....	3	17	14
Total reports on these days.....	26	191	142
Total m.f. on these days.....	4	35	32
Per cent of m.f.	15	18	22

experimental hour) under three headings. By a 'P mood' we mean the report of pleasantness, cheerfulness, energy, keen-

ness for work, etc. By a 'U mood' we mean the report of unpleasantness, fatigue, illness, sleepiness, depression, etc. By an 'Indifferent mood' we mean (1) a mood that is neither P nor U, or (2) a 'mixed mood' which contains both P and U elements in alternation. B reports a good many 'mixed moods' the components of which are never present simultaneously but always in alternation. From these tables it appears, both absolutely and relatively, that a U mood is favorable to the report of mixed feelings.

Following are a few citations from the moods on 'mixed feeling' days (Table IV):

"I have had an attack of migraine. Am indisposed and disagreeable . . . (later) This headache makes it difficult to observe" (Da 17th day, the only day this subject reports a m. f.). "My mood is dull gray. I am rather tired" (F 11th day, 3 m. f.). "Very tired" (H 14th day, the only day in the last three divisions on which there is a report of m. f.). "Deep physical and mental weariness probably due to bad headache. Inability of mind to drive body. I knew I was late to the experiment but couldn't hurry much" (K 5th day). "Too sleepy to be anything but disagreeable" (K 13th day). "My mood is subdued, not very P. Great lassitude and inactivity" (K 19th day). "Too weary to have an intense, lasting mood. The weariness itself is slightly U" (K 23rd day, 5 m. f.). "Neutral . . . (later) I don't think I introspected very carefully to-day. I have had an hour-and-a-half session with X and this was tiring" (O 18th day, 4 m. f.).

A third factor favorable to the report of mixed feelings is lack of practice and training on the part of the subjects.

At the close of the first division of the experiment we were left with the result that H had reported 10 mixed feelings (75 reports), F 3 (76 reports), G 2 (62 reports), W 2 (60 reports), K 1 (84 reports) while B, Da, Di and O had reported none (Tables II, III, IV, V). At this point in the experiment we were ready to accept coexistence as a fact. The experiment was continued (1) to increase the number of mixed feelings, (2) to see if the four subjects who reported none would eventually report them, and (3) to get reports more psychological in their form of statement. We noticed that the reports contained a good deal of *Kundgabe*, and accordingly at the start of the second division of the experiment the subjects were warned against the "stimulus-error."

This instruction to avoid the stimulus error apparently had a good deal of effect in the case of H and F. After the warning H's type of report changed suddenly from the objective to the psychological and the reports remained psychological for the rest of the experiment. With this change mixed feelings disappeared, except for a single doubtful case (14th day, mood "very tired"). With F the change from the objective to the psychological type of report was gradual. In the fourth and final section of the experiment, however, her reports are entirely psychological and here there are no mixed feelings. The disappearance of mixed feelings with the change from the common-sense to the psychological type of report is of paramount importance. It shows that lack of practice and training in affective report is a condition favorable to mixed feelings.

The effect of practice is not so marked with the other subjects. K, indeed, shows a positive decline from fairly careful objective report to brief and seemingly perfunctory statements.

A fourth factor favorable to the report of mixed feelings is suggestion.⁴⁰

The large group of mixed feelings reported by subject K on days 17 to 24 demands a special word of explanation. K reported a single case of coexistence in the work with situations (84 reports), and not even a doubtful case in the work with single stimuli (75 reports). Yet in the two final sections of the experiment (97 *plus* 51 reports), the record for 8 successive days shows 4, 7, 3, 2, 2, 3, 5, 2 mixed feelings. Previous to this group the record of K was normal. Some new factor must have become operative about days 16 or 17.

We learned that K, in fact, at this time became (or was made) aware of the specific object of the present investigation. Here is evidence of suggestion. A quantitative study of the reports also reveals the fact that K is given more to anticipation of P and U than any other subject. Moreover, she sometimes reports "P as usual." "U of course," etc.,—phrases which indicate suggestibility. We can fairly conclude that suggestion is favorable to the report of mixed feelings.

A fifth factor favorable to the report of mixed feelings is habituation to a form of report.

We have noted that mixed feelings occur in sporadic groups extending over several days and that within the single experimental hour they tend to occur in consecutive reports. Since our stimuli were presented in haphazard combinations, approximately the same for all subjects, this group-tendency cannot be due to the achievement of specially refined external conditions such as, *e.g.*, a nice intensive balancing of stimuli. Probably it is due to the persistence of internal conditions: lack of training, suggestion, or illness. But within the single experimental hour it is difficult to see how such general conditions can account for the tendency for mixed feelings to occur in consecutive reports. This tendency, we believe, is due to the persistence of a set or determination to report in a peculiar manner. The subject becomes habituated to a given form of report.

V. EXPERIENCES RESEMBLING MIXED FEELING

There are certain types of experience which simulate co-existing P and U and which are, in fact, sometimes reported as "mixed feelings." These types are illustrated below.

⁴⁰Johnston, *op. cit.*, 163. "There is a great danger that the investigator will unwittingly make suggestions to the subjects by his questions. There is a great danger of auto-suggestion on the part of the subject. The likelihood is also considerable that the subjects will fall into stereotyped forms of expression and general listlessness in introspection. . . . Again the special mood of the day will necessarily tend to affect all such feeling-attitudes toward slight stimulations supposed to have a feeling-tone."

1. *Rapid alternations of P and U*

"I think I should have said P-U or U-P . . . They seemed to be up and down in consciousness, first one and then the other" (G 51). "A very, very rapid fluctuation between mild U and mild P" (G 155). "The regret is what I should call a mixed feeling. I should say it was a very, very rapid fluctuation between P and U . . . You get the succession P-U-P-U (I can't say how many times) as a unitary thing" (G 198). "I seemed to get a rapid alternation between the P and the U" (H 151). "Both are there interchanging so quickly that I can't always report at the instant you say 'now.' They do not exist together but alternate" (Di 21). "Rather P. Rather U. . . I alternate right through from one to the other" (B 84). "The odor was a mixed feeling . . . I can't say that the affects were simultaneous; they may have been oscillatory" (O 145).

Alternations are sometimes correlated with respiration when odors are used as stimuli. "An alternation of P and U between respirations" (W 4). "Oscillation from P to U. It is U when I take a breath and smell the stuff and P when I exhale because the P stimulus is still there" (Di 150). "When I breathe in it is U and when I breathe out it is P" (F 192). "Every time I breathed in consciousness was U and every time I breathed out consciousness was P" (Da 206).

2. *Affective doubt.* Affective doubt is an alternation between P and U which may be expressed as an attitude 'I don't know whether I like it or not.'

"Then with the next whiff came an attitude 'I don't know whether I like it or not.' It has things in it that you like and things that you don't like. As to the course in this place it seemed that P came first and that was followed by U. I can't say whether P came again" (W 129). "I don't know whether I like it or not. A slow alternation from one to the other. One moment it is P and another moment it is U. It left me doubtful" (H 159). "I don't know whether I like it or not, in which the course of feeling was a fluctuation from P to U with the P periods somewhat longer than the U" (H 186). "That was violently P or violently U. I can't say which" (K 52). "I don't know. Rather an alternation back and forth of the feelings" (K 124). "I don't know whether the first was P or U. I guess this was probably a rapid alternation between P and U" (K 201). "A rapid alternation between P and U so I can't say which it is" (K 157).

The alternation that characterizes affective doubt may take place at a low, moderate, or high feeling intensity. K's doubt between 'violent P' and 'violent U' involved an intense U evoked by noise and an intense P evoked by amusement at the situation. The alternations left her doubtful as to whether the experience was P or U.

Intellectual doubt (so far as our data go) is U; affective doubt is both P and U. Note the following:

"Then there was a brief period of doubt and uncertainty, slightly U. The doubt was of an intellectual sort as to whether the experience

was P or U. This doubt itself was U" (H 211). "I couldn't make up my mind. It was an intellectual experience. The inability to find it agreeable was U" (O 80). "Then an attitude which meant 'I don't know whether I like it or not.' I am rather inclined to report that that was U" (W 131).

3. *Interrupted mood.* An established mood may be interrupted briefly by an affection of opposite sign. The mood may be conceived as permanent, but the reports show that there is no coexistence of P and U.

"The P was a shifting background except for two times. It was like punching a hole through it. The strokes were U and between them I went right back to where I had been" (B 161). "There is a background that seems to be my mood with these Ps and Us playing in front of it. I can't tell whether the mood breaks off suddenly (like a hole in it) or whether it is merely attentive obscurity. So far as conscious content goes it drops out under keener Ps and Us" (B 191). "It seemed as if the background of P had been there all the while although I never found the two [feelings] there together" (B 185). "P, of course, to start with. Then a hole in that P when my attention went from the candy to the [U] picture" (Di 236). "The U quickly disappears and the quiet P seems to sweep over again so that I have a background of P which seems to last over and continue after the U disappears. It is not P, though, when the U is going on, but when it comes again I think of it as a permanent thing" (G 18). "First a moderate P with just a touch or flash of U which attached to the cutaneous pain at the end of this sensory experience. It was really a shift of attention, I suppose, but it was such a rapid thing that the U seemed to be set in a background of P . . . I'm sure it was a rapid shift of attention, but when it was back in P I got the impression that it was just as if it had existed right straight through" (G 161). "There seemed to be a background of U. I was uncomfortable but the sensory experiences were both P. What happened, I know, was that while I was attending to the sensory experience I got the P, and as soon as it was gone I got the uncomfortableness, and the U would sometimes just cut across the P" (G 171). "There is a sort of background of P that seems to carry across somehow . . . The only reason I'm saying there is a background of P is because there is a memory hangover and anticipation that is P" (W 124).

4. *Meaning-feeling mixtures.* The meaning of pleasantness (which may have any one of the three time-references) may be present simultaneously with the feeling of unpleasantness, and conversely. Following are examples:

"It is U and there is the realization that P is coming in but there is no P feeling at all yet" (F 241). "The U hangs over while I am still conscious of the P stimulus" (F 246). "I knew I liked it but the other was too U to let me attend to it" (K 67). "The auditory experience was U but I realized that I could attend to the odor and then it would be P" (K 185). "Slightly U. It had a hint of P in it . . . as if it were like something that is P" (W 98). "The first was P . . . It seemed to have a suggestion of U in it" (G 151). "The

first was an agreeable feeling and as it went on there was a question whether it would remain agreeable, and there was the anticipation that it might become disagreeable" (O 76). "The taste was P but it had a hint of disagreeableness. I can't say that it was disagreeable" (O 132). "I recognized the odor as one that might be U but it was P" (O 177). "I like that despite the fact that I know I'm not supposed to" (B 111). "I like being resentful at that—P. It is a P I disapprove of" (B 132). "I enjoyed being mad at a thing like that and that was P. It seemed such a proper thing to be angry at two conflicting rhythms and the appropriateness of it pleased me" (B 166).

In many of the meaning-feeling mixtures the meaning and feeling are not present simultaneously but in some sort of alternation. Under the head of simultaneous meaning-feeling mixtures we might classify our 71 "mixed feelings," since there can be little doubt that one, or both, of the coexisting "feelings" is a meaning that attaches to an object.

CRITICISM OF PREVIOUS EXPERIMENTAL WORK

The experiments of Orth, Hayes, and Alechsieff yielded a negative result; no mixed feelings were reported. Since the number of reports in these investigations was small and the number of subjects few, possibly mixed feelings would have been reported had the work been extended. Kellogg remarks⁴¹ that "Alechsieff's results only go to confirm our own." We do not see how a negative result 'confirms' a positive; but since "there were several hundred trials which gave this same result" there is certainly no contradiction between the early negative and the more recent positive results. It is probable that the subjects in the early work had had a good deal of practice in affective report before the problem of mixed feelings was attacked; at least the account of mixed-feeling experiments is given at the very close of the articles of Orth, Hayes, and Alechsieff. Since two of our subjects showed a distinct practice-effect, it is possible that the training gained in these extended investigations of feeling is a factor in the negative result.

There can be no doubt that mixed feelings are reported sporadically by certain subjects. This result confirms Johnston, Nakashima, Koch, Kellogg, and Wohlgemuth. Our stimuli include all the types used by previous investigators and our results, both quantitatively and qualitatively, are in agreement with theirs. However, we differ from Johnston and Kellogg in the interpretation of the facts. We can not accept mixed feelings as accurate reports of affective experience since an analysis shows that they involve a confusion between 'meaning of pleasantness' and 'pleasantness felt.' This confusion was discovered and reported by the subjects themselves.

Johnston⁴² is concerned with other problems than mixed feeling. For example, he is interested in the description of simple feelings, the bodily accompaniments of feeling, the temporal relations of feeling-tones from simultaneous stimuli, etc. It is all the more important, then, that we be told how long the work upon mixed feelings lasted

⁴¹Kellogg, *op. cit.*, 91.

⁴²For a criticism of Johnston's work see: Titchener, E. B., *Feeling and Attention*, 1908, 48-55.

and how many reports were given; but Johnston does not print a report or a figure. He merely states his conclusions without showing how they follow. Under these conditions we can not give a great deal of weight to his generalizations.

Kellogg's method is not adequate, although his experimental conditions are favorable to the report of "mixed feelings." In the first place, the use of picture-stimuli favors intellectualization and the meaning-error. In our experience the feelings evoked by pictures are weak when compared with those aroused by hunger, nausea, putrid odors, candy, perfume, warmth, music, etc. In the second place, rates of alternation varying from 10 to 115 per min. are not favorable to the rise of feeling. According to Nakashima⁴³ "the shortest time necessary for the affection to arise varies from 0.72 to 1.08 secs." This indicates that no feeling alternations can be obtained at rates above 55 to 83 per min. Kellogg⁴⁴ himself notes that feeling disappears at about these rates of alternation. Even the slowest rate (10 per min.) gives barely enough time to establish a feeling of moderate intensity. In the third place, the duration of the test was too long for accurate observation. Considering the printed exposure times as representative, we find the following distribution:

Duration of test.....	10"	20"	24"	30"	40"	45"	60"
Number of reports....	6	23	4	167	24	55	18

This gives an average duration of 34.1 secs. Our subjects complained that 20 secs. was too long, and we found 5 to 15 secs. the most satisfactory interval. Very few subjects could give an accurate report of an affective experience of any complexity lasting 60 secs.! These long exposures favor confusion of memory and hence the inference of feeling from meaning.

Kellogg claims to have found a positive correlation⁴⁵ between "(1) Tendency to parallel or mixed feelings and quickness in response," and "(2) Tendency to parallel or mixed feelings and scope of attention." To determine 'quickness in response' he increased the speed of alternation of his pictures and then decreased it again in order to determine the point at which feeling disappeared, the assumption being that the greater the affective sensitivity, the faster the rate at which the subject could obtain feeling. The number of tests was small, and they were made with both 'passive' and 'active' attitude, but despite these considerations the subjects are rated according to 'quickness in response' and a correlation of .562, P. E. .101, is worked out according to Spearman's foot-rule. In order to test this result we have resorted to the temporal records in our work with single stimuli. Our subjects were instructed "to report immediately upon the affective character of the experience." The time was taken with a stop-watch between the presentation of the stimulus and the first word of response. Although the values are not affective reaction-times, they should be sufficiently accurate for determining gross

⁴³Nakashima, T., Time-relations of the Affective Processes. *Psychol. Rev.*, 16, 1909, 310.

⁴⁴Kellogg, *op. cit.*, 83-7.

⁴⁵Kellogg, *op. cit.*, 88.

differences in 'quickness of response.' These results are tabulated below:

Subject	K	G	F	Da	W	Di	H	B	O
Number reports.....	45	39	42	45	41	43	25	25	32
Av. time (secs).....	3.4	3.6	4.6	4.9	5.1	5.1	5.8	7.1	10.3
M.V. time.....	1.0	1.4	1.4	2.4	1.8	1.8	1.7	3.8	4.3

If we consider the *number* of "mixed feelings" reported, we find the following rank order: K, H, F, O, G, Di and W, Da, B (Table I). The two series show a correlation of .43 (somewhat less than Kellogg's, but still positive) with a P. E. of .14. Our correlation is between the tendency to *report* "mixed feelings" and the tendency to respond quickly. If, however, we group the subjects according to type (as regards the report of "mixed feelings") the result is very different. Five subjects—B, Da, Di, G, W—report no unequivocal "mixed feelings" and belong to a single group. Two subjects—H, F—at first report "mixed feelings," but show a practice-curve. Two subjects—K, O—report "mixed feelings" and show no practice-effect. K and O belong to the same group as regards the tendency to report "mixed feelings," but K's responses are the quickest and O's the slowest! We believe that K's quick responses are offhand reports, while O's slow responses are reflective judgments. Both types⁴⁶ of response are favorable to the report of "mixed feelings." As regards the second correlation, "scope of attention" was not measured by us. Kellogg's subjects were asked to do mental arithmetic while the rate of alternation of the pictures was being gradually increased and decreased, and to report when feeling disappeared. The assumption underlying the method is that the ability to do mental arithmetic and to obtain feelings from rapidly alternating pictures indicates "scope of attention." Kellogg, however, notes⁴⁷ that the results "are not very satisfactory, owing to the fact that the adding soon gets mechanized, and also that some of the subjects add visually, so that interference of an unwelcome sort came in. Still, though two series are hardly a sufficient basis for generalization, the results seem to indicate that distraction has less inhibitory effect with those subjects who have the stronger tendency to mixed feelings." If range of attention were accurately measured, we should probably find a constant; but a measure of attention that is to be correlated with tendency to report "mixed feelings" should not involve the feeling factor!

Kellogg introduces his concluding section by the statement that "The 'law of algebraic summation' of feelings is quite inadequate to account for the results obtained . . . Simple algebraic summation is only occasional. Displeasure may inhibit displeasure, rather than add to it." Our unpublished results with controlled attention, so far as they go, seem to indicate that two simultaneous stimuli to U, or to P, may result in indifference. The matter demands further investigation.

⁴⁶There is perhaps a sex difference. The 3 women subjects are quicker in response than the 7 men, and Nakashima found a shorter affective reaction time for women than for men. (*Am. Jour. of Psychol.*, 20, 1909, 191).

⁴⁷Kellogg, *op. cit.*, 86.

Kellogg's further conclusion that "mixed feelings" occur when the 'apperceptive attitudes' are similar does not follow from his results, or at least we are not shown how it follows. There is no mention of a measure of similarity of attitude. There is, further, a confusion between (a) similarity of stimulus-object and (b) similarity of attitude.

CONCLUSIONS

1. Pleasantness and unpleasantness are not felt at the same time. So-called "mixed feelings" involve the awareness of an object to which the meaning of pleasantness, or unpleasantness, is attached. This "object-feeling" may be localized and attended to.

2. Our results compel a distinction between the meaning of pleasantness (or unpleasantness) and pleasantness (or unpleasantness) felt. "Mixed feelings" involve a confusion between the meaning of pleasantness (or unpleasantness), which is referred to an object, and affective experience. This confusion, which the subjects themselves remark, we have called the *meaning-error*. The meaning-error is favored by (1) intellectualization, (2) unpleasant mood as fatigue, illness, sleepiness, worry, etc., (3) lack of practice and training in psychological report, (4) suggestion, and (5) habituation to a form of report.

3. "Mixed feelings" are reported rarely and in sporadic groups throughout the course of the experiment and the single experimental hour. The subjects show marked individual differences in the tendency to report "mixed feelings." Five of the nine subjects report no unequivocal "mixed feelings;" one does not even report a doubtful case; another reports more than half of the total number. Of the reports of "mixed feeling" more than a third contain some expression of doubt and uncertainty.

4. There are four types of normal experience resembling "mixed feeling:": (1) rapid alternations of pleasantness and unpleasantness, (2) affective doubt, (3) the brief interruption of an established mood which is conceived as permanent, and (4) the awareness of a pleasant object while one feels displeased, or the awareness of an unpleasant object while one feels pleased.